



Original paper

# Is the depression level the factor influencing the effectiveness of the group weight reduction program?

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## Abstract

**Introduction:** The aim of the study was to assess the influence of the depression level on the effects of the group weight reduction program.

**Material and methods:** The study group involved 57 overweight and obese subjects [age  $45.9 \pm 13.9$  years, body mass index (BMI)  $35.5 \pm 5.4$  kg/m<sup>2</sup>]. All patients participated in a 3-month group weight reduction program. Body mass and height were measured and BMI was calculated, the depression level was assessed using Beck's Depression Inventory (BDI) at baseline and at the end.

**Results:** At baseline, the moderate depression level occurred in 8 women (BDI  $23.1 \pm 3.0$  points), mild depression level in 22 subjects – 20 women and 2 men (BDI  $13.4 \pm 2.4$  points) and 27 subjects – 22 women and 5 men did not have features of depression (BDI  $5.5 \pm 2.8$  points). Subjects with severe and mild depression levels were significantly older than these without features of depression ( $p < 0.005$ ). We did not observe differences of BMI between study subgroups. There were no correlations between body mass and BMI, and the depression levels. The body mass and depression levels decreased significantly in all study subgroups after the group weight reduction program with psychotherapy. We observed a significant decrease in both body mass and depression level in all study subgroups. The mean weight reduction was similar in all study subgroups.

**Conclusion:** The depression level at baseline did not influence the effectiveness of the group weight reduction program.

**Key words:** weight loss, depression level, group weight reduction program.

## Introduction

Numerous studies revealed an association between obesity and depression [1-3]. However, it is still unknown which of these diseases is the cause and which is the result. There are some hypotheses describing possible links between obesity and depression. One of these hypotheses suggests that obesity and depression are polygenic and heterogenic diseases, and their causes are partially genetic and conditioned also by environmental factors [4,5]. Possible pathophysiological links between obesity and depression comprise hyperactivation of the hypothalamus-hypophysis-adrenal axis [6], changes of sympathetic nervous

system activation [7,8], disturbance of neurotransmitter secretion [9-13] and immune activation [14-17].

It seems that there are forms of obesity and depression with a connection in the pathogenesis as well as forms without these links. As described above, trends of these relations may be different. It has already been proved that occurrence of depression may precede the development of obesity and, quite the reverse, the development of depression may follow development of obesity, moreover, both diseases may develop at the same time [4,5]. Our previous studies [18] revealed that in a population of 217 patients starting the group weight reduction program, the prevalence of depression reached 59%. Numerous recent stud-



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Table 1. Characteristics of study subgroups divided according to the depression level and the effect of treatment

	Subgroup A			Subgroup B			Subgroup C		
	Before	After	Δ	Before	After	Δ	Before	After	Δ
<i>n</i>	8 women			22 (20 women and 2 men)			27 (22 women and 5 men)		
Age (years)	49.7 ± 13.8 <sup>&amp;&amp;</sup>			49.7 ± 14.6 <sup>#</sup>			41.8 ± 13.0		
Weight (kg)	93.4 ± 18.3	84.1 ± 16.7 <sup>***</sup>	9.3 ± 3.8	100.4 ± 21.1	90.1 ± 19.1 <sup>***</sup>	10.2 ± 5.9	96.8 ± 16.7	87.1 ± 14.7 <sup>***</sup>	9.7 ± 4.4
BMI (kg/m <sup>2</sup> )	36.8 ± 7.1	33.1 ± 6.5 <sup>***</sup>	3.7 ± 1.5	36.0 ± 5.3	32.4 ± 5.0 <sup>***</sup>	3.7 ± 2.0	35.3 ± 5.1	31.8 ± 4.3 <sup>***</sup>	3.5 ± 1.6
BDI (pts)	23.1 ± 2.9	8.0 ± 4.6 <sup>***</sup>	15.1 ± 3.7 <sup>##&amp;&amp;</sup>	13.4 ± 2.4	5.8 ± 4.3 <sup>***</sup>	7.6 ± 4.6 <sup>++</sup>	5.4 ± 2.8	3.4 ± 3.4 <sup>*</sup>	2.0 ± 3.9

\**p* < 0.01; \*\*\**p* < 0.0001 before vs. after; #*p* < 0.005 subgroups A vs. B; &*p* < 0.005 subgroups A vs. C; ++*p* < 0.005 subgroups B vs. C

ies have reported that weight loss achieved with a lifestyle modification improved symptoms of depression [19-22]. On the other hand, depression may be one of the factors worsening the effects of weight reduction therapy. Therefore, the aim of the study was to assess the influence of the depression level on the effectiveness of the group weight reduction program.

## Material and methods

The study group involved 57 overweight and obese subjects: 50 women and 7 men [45.9 ± 13.9 years, body mass 96.7 ± 18.2 kg, body mass index (BMI) 35.5 ± 5.4 kg/m<sup>2</sup>].

All study subjects participated in a 3-month group weight reduction program (original program drawn up by Professor Zahorska-Markiewicz). The program consisted of a group instruction in behavioural and dietary methods of weight control carried out every two weeks and group psychotherapy using cognitive, behavioural and autohypnosis techniques. Subjects used a low fat diet with a deficit of 600-800 kcal/day and aerobic physical exercises 30-40 min/day.

Body mass and height were measured and BMI was calculated. All subjects completed the Beck Depression Inventory (BDI) at baseline and at the end [23]. The score of less than 10 points was qualified as no depression, score of 10-18 points as a mild depression level, and above 19-29 points as a moderate depression level and 30-69 points as a severe depression level.

The study was approved by the local Ethics Committee. All subjects gave their informed consent to the study.

## Statistical analysis

All statistical analyses were performed with the use of Statistica 8.0 software. Results are presented as means ± SD. The Mann-Whitney *U* test was used for comparison between study subgroups. The results were considered as statistically significant with a *p* value of less than 0.05.

## Results

On the basis of the BDI, study subjects were divided to three subgroups: A – moderate depression level, B – mild depression level and C – no depression. Subgroup A included 8 women (14.0% of the study group), subgroup B – 22 subjects (20 women and 2 men) (38.6%) and subgroup C – 27 subjects (22 women and 5 men) (47.4%). Subjects with mild and moderate depression levels were significantly older than these without depression. At baseline we did not observe differences in body mass and BMI between study subgroups. The depression levels decreased significantly in all subgroups. No differences in mean weight reduction between subgroups were found (Table 1).

**Table 2.** Characteristics of study subgroups divided according to gender and the effect of treatment

	Subgroup W			Subgroup M		
No.	50			7		
Age (years)	45.9 ± 14.0			46.0 ± 13.6		
	Before	After	Δ	Before	After	Δ
Weight (kg)	94.4 ± 17.2	85.1 ± 15.8***	9.3 ± 4.5	113.2 ± 17.6	101.4 ± 13.6***	11.8 ± 7.0
BMI (kg/m <sup>2</sup> )	35.4 ± 5.5	31.9 ± 5.0***	3.5 ± 1.7	36.7 ± 5.4	32.9 ± 4.2***	3.8 ± 2.3
BDI (pts)	12.1 ± 8.7	5.4 ± 4.9***	6.7 ± 7.0	8.7 ± 2.9	3.6 ± 4.0***	5.1 ± 3.5

\*\*\**p* < 0.001 before vs. after

Similar results were obtained when the study subjects were divided into gender-related subgroups: W – women and M – men. These subgroups are equal in terms of age, body mass and BMI. The depression level was not significantly higher in subgroup W than M. In both these subgroups the depression level and body mass decreased significantly at the end of the program (Table 2).

## Discussion

As described above, numerous studies revealed links between obesity and depression. Our previous study [18] revealed that about 60.0% of obese subjects starting the group weight reduction program had mild or severe depression levels. Similar results were obtained in the present study (52.6%). Similarly to results obtained recently [24,25], the higher depression level was found among women than men.

Regardless of baseline depression levels and gender, we observed depression significant decrease after weight loss. It is difficult to clarify whether this decrease in depression levels are a cause of body mass reduction or are the effects of psychotherapy. Admittedly, previous studies show that weight loss is accompanied by a decrease in depression levels also in programs without psychotherapy but in some of them, patients took sibutramine. Therefore, it is also unclear whether the decrease in depression levels was the effect related to weight reduction only or mainly due to sibutramine stimulated serotonin neurons activity in brain [26,27]. Independently of factors that improved depression levels during weight loss, the high number of obese subjects with mild and severe depression symptoms suggests that psychotherapy is an important component of the obesity treatment.

Limited evidence suggests that depression is associated with poorer outcomes in behavioral weight loss programs. However, few studies revealed also that baseline depression levels did not influence the effectiveness of weight reduction therapy [26-30]. In our study, there were no differences in weight reduction when study subjects were grouped

by moderate, mild and no depression levels. It should be emphasized that in terms of baseline body mass and BMI, these subgroups were similar. The results were also comparable when the criterion of identity was gender. Therefore, it seems that baseline depression levels did not disturb the weight reduction, although as observed previously, the depression level increased with severe obesity [17,27].

The limitation of our study is the size of the study group and its cross-sectional design.

In conclusion, the depression level at baseline did not influence the effectiveness of the group weight reduction program.

## Disclosure

Authors report no conflict of interest.

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